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Coulomb Corrections to Delbrück scattering

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Delbrück scattering is the process in which a photon is elastically scattered by an atomic nucleus via the production of virtual electron-positron pairs. It is one of the few non-linear quantum electrodynamical processes that can be observed experimentally and, hence, testing the respective theoretical predictions serves as an important test of QED in strong electromagnetic fields. Despite the strong motivation, most theoretical studies in the past have been limited to the lowest-order Born approximation in which all interactions with the Coulomb field beyond the lowest order are neglected. This assumption makes the predictions unreliable in the high- Z regime. Therefore, we present a new approach to evaluate Delbrück amplitudes without any approximation regarding the coupling to the nucleus (Phys. Rev. A 105, 022804).

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